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July 10, 1996

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Mr. William F. Caton
Office of the Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, DC 20554

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Dear Mr. Caton:

On behalf of Hammett & Edison, Inc., Consulting Engineers, enclosed are six copies of our comments to Mass Media Bureau Docket 87-268 concerning Advanced Television. The deadline for comments to this rule making is July 11, 1996, so these comments are timely filed.

Sincerely yours,

William F. Hammett

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Enclosures (6)

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**FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY**

**Comments of
Hammett & Edison, Inc.
Consulting Engineers**

**MM Docket 87-268
Advanced Television Systems
Fifth Further Notice of
Proposed Rule Making**

July 10, 1996

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HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

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**FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY**

In the Matter of)

Advanced Television Systems)
and Their Impact Upon the)
Existing Television Broadcast)
Service)

MM Docket No. 87-268
Fifth Further Notice of
Proposed Rule Making

To: The Commission

Comments of Hammett & Edison, Inc.

The firm of Hammett & Edison, Inc., Consulting Engineers, respectfully submits these comments in the above-captioned proceeding relating to Advanced Television Systems. Hammett & Edison, Inc. is a professional service organization that provides consultation to commercial and governmental clients on communications, radio, television, and related engineering matters.

I. Qualifications of Hammett & Edison, Inc.

1. Hammett & Edison, Inc. is well qualified to make comments on this matter, having been designing AM, FM, and TV broadcast stations for over 40 years, preparing the engineering portions of FCC applications for those stations, commenting on FCC rule makings, and participating in broadcast industry professional organizations such as the Institute of Electrical and Electronic Engineers (IEEE), the Association of Federal Communications Consulting Engineers (AFCCE), the Society of Motion Picture and Television Engineers (SMPTE), and the Society of Broadcast Engineers, Inc. (SBE).

II. "Grand Alliance" DTV System Should be Adopted as Mandatory

2. We believe that the "Grand Alliance" system for digital television ("DTV") should be adopted as mandatory, as proposed. The need for a single, nationwide standard for broadcast transmissions is fundamental to the viability of this new broadcast service. The Grand Alliance DTV standard is, as its name implies, a consensus standard and, we believe, an entirely adequate one, with ample flexibility to accommodate future technical developments.

3. A mandatory standard will encourage receiver manufacturers, both new and established, to produce DTV receivers. A climate with numerous competing manufacturers, mass-producing receivers and realizing the resulting economies of scale, will help to drive



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down the price of DTV receivers, encouraging their widespread acceptance and leading to commercial success for the new service.

III. Commission Should Specify 300 kHz Rather Than 500 kHz Resolution Bandwidth for Emission Mask Measurements, or Alternatively Allow Either 300 kHz or 500 kHz Resolution Bandwidths

4. At Paragraph 56, the Commission proposes to adopt an emission mask that would specify the limits for out-of-channel emissions for a DTV station. We suggest that a 300 kHz resolution bandwidth would be a more practical choice, as this resolution bandwidth is routinely offered on Tektronix spectrum analyzers, whereas a 500 kHz resolution bandwidth is not. Tektronix spectrum analyzers are widely used in the broadcasting industry, and selection of a resolution bandwidth not available on such instruments would be an unnecessary burden. Alternatively, the Commission could allow the use of either a 300 or 500 kHz resolution bandwidth, with a +2.2 dB correction factor if a 300 kHz resolution bandwidth is used in lieu of a 500 kHz resolution bandwidth.*

IV. Proposal to Maintain DTV Pilot Frequency 5.082138 MHz Above Lower Adjacent Channel NTSC Visual Carrier Is Not Practical

5. At Paragraph 57, the Commission proposes that the DTV pilot carrier be maintained 5.082138 MHz above the visual carrier frequency of any lower-adjacent NTSC standard definition television ("STV") station, to a tolerance of ± 3 Hz. We believe this to be impractical, because the FCC Rules allow the visual carrier frequency of STV stations to vary up to $\pm 1,000$ Hz.† For the DTV-STV intercarrier spacing to be maintained truly to a tolerance of ± 3 Hz, the DTV transmitter would have to phase-lock its pilot carrier to the carrier of the lower adjacent channel STV station. We do not believe that the licensee of a DTV station, or manufacturers of DTV transmitters, need be faced with this burden.

6. The DTV pilot carrier frequency should instead be referenced to the DTV band edge. This would make the DTV transmitter frequency stability the only factor affecting the accuracy of the DTV pilot frequency, and it would not force DTV licensees, with a ± 3 Hz frequency stability requirement, to have to chase a "moving target" in the form of an STV

* For a Gaussian bandpass filter, used in most spectrum analyzers, and a uniform signal distribution in the frequency domain over the measurement bandwidth, the "correction factor" for signal level versus measurement bandwidth follows the "10log" rule. Therefore, $10\log_{10} (500 \text{ kHz}/300 \text{ kHz}) = 2.2 \text{ dB}$.

† Section 73.1545(c)(1) of the FCC Rules.

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visual carrier with a mandated frequency stability almost three orders of magnitude less strict.

V. Miscellaneous Procedural or General Broadcast Rules that May Be Modified or Adapted for DTV

7. At Paragraph 59, the Commission seeks comment on whether certain existing technical and procedural rules should be modified to include DTV or should be changed to treat DTV differently from the NTSC or other broadcast services are treated. Therefore, consideration is recommended of several rules changes.

8. Section 73.611 Reference points and distance computations. No method for calculating azimuth angle between two points is included in the rules. Two methods are in common use: the "right triangle" and "spherical Earth" methods. We recommend that the spherical Earth method, defined in the "Agreement Between the Government of Canada and the Government of the United States of America Relating to the FM Broadcasting Service and the Associated Working Arrangement" (Ottawa, February 1991) and elsewhere, be adopted as the official method.

9. Section 73.684 Prediction of coverage. The present procedure for calculating coverage is widely acknowledged to be inaccurate in many or even most situations. With the wide availability of inexpensive digitized terrain elevation databases, there is no need for the continued use of truncated terrain data, which ignore obstructions large enough to affect or even block coverage.

Various algorithms have been used for many years to predict path loss between two points or along specified terrain profiles. The most familiar "cookbook" of such algorithms is *National Bureau of Standards Technical Note 101*. We suggest that the FCC seek comment on use of terrain-sensitive propagation models, such as the terrain-integrated rough-earth model (TIREM), which is used by the NTIA and other Government agencies. Adoption of a deterministic terrain-based approach to coverage prediction will lead to much more efficient use of the spectrum. Specific application of such an approach to DTV service or protection requirements may be appropriate.

10. Section 73.686 Field strength measurements. The present rule requires either "mobile runs" of 100 feet or measurement "clusters" using antennas raised 30 feet above ground. With the common availability of GPS systems, and the possibility of obtaining reliable signal strength data closer to the ground, it is recommended that alternative methods, such as collecting continuous coverage data using a computer, be permitted under certain conditions.



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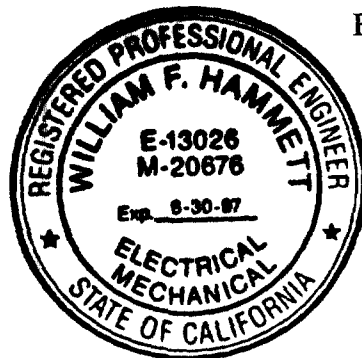
For instance, when it is desired to demonstrate coverage of a station's principal community, a reasonable demonstration of this might be made by driving some portion of the streets of that community and observing City Grade signal strength over some portion of the recording distance with a lower height antenna of, say, seven feet.

IV. Summary

11. The Commission should adopt the Grand Alliance system of DTV as a mandatory standard for the United States. The importance of adopting a single standard for broadcast transmissions was demonstrated by the "AM Stereo" debacle, where the Commission attempted to let the "marketplace" select a technical standard. Subject to the minor points discussed above, Hammett & Edison urges the prompt adoption of the Grand Alliance system. Lest the modern DTV be fated to travel alongside the superhighway in the ruts of the horse and buggy, the FCC must act.

Respectfully submitted,

By William F. Hammett
William F. Hammett, P.E.
President



July 10, 1996